

DETAILED ACTION

(1). Applicants' Remarks filed on 9/15/2011 has been received.

Claims 1-4, 10 and 12 were cancelled before.

The rejections of claims 5-9, 11, 13-16 in prior Office Action dated 6/15/2011 is sustained.

Claim Rejections - 35 USC § 103

The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

(2). **Claims 8-9, 5-6 and 13-16** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chakravart et al (US 6497852B2) in view of Rønning et al (US 5832712A)

As to a regeneration process for an aqueous, acid gas-rich absorption Fluid comprising at least one nitrogen-based chemical absorbing agent for an acid gas which absorption fluid contains a chemically absorbed acid gas comprising a) hydrogen sulfide, b) carbon dioxide or c) both of gases, process comprising 1) stripping acid gas from the acid gas-rich absorption fluid in a pressure vessel operated at essentially a single pressure in excess of about 50 psia and below about 300 psia, Wherein heat is supplied to the Fluid in the Vessel by a re-boiler in a sufficient quantity that the fluid is at a temperature from 294° F and below 400° F; and thereafter 2) recovering an acid gas-rich gas stream from vessel while maintaining the stream under pressure and 3) introducing gas stream into a 1st stage compressor and 4) thereafter reducing by compression the volume of gas stream in independent claim 8, where the gas stream is, after compression, disposed by injection to an ocean- or sea-bed or into a subterranean chamber or formation in claim 9, where at least one Agent in the treatment Fluid is an alkanolamine comprising 2 to 6 carbon atom in claim 5, where at least one agent selection in claim 6, wherein the stripping acid gas from the acid gas-rich absorption Fluid takes place in a pressure Vessel at a pressure in excess of about 55 psia and below about 300 psia in claim 13, wherein the stripping acid gas from the acid gas-rich absorption Fluid takes place in a pressure Vessel at a pressure in excess of about 130 psia and below about 300 psia in claim 14, wherein the stripping acid gas from the acid gas-rich absorption Fluid takes place in a pressure Vessel at a pressure in excess of about 50 psia and below about 200 psia in claim 15, wherein the stripping acid gas from the acid

gas-rich absorption Fluid takes place in a pressure Vessel at a pressure in excess of about 50 psia and below about 155 psia in claim 16, Chakravarti et al (US 6497852B2) disclose Carbon Dioxide Recovery at High Pressure (Title). Carbon dioxide is recovery from a feed stream whose pressure is up to 30 psia by preferentially absorbing carbon dioxide from feed stream into a liquid absorbent fluid, pressurizing and heating the resulting stream to a pressure sufficient to enable the stream to reach the top of the stripper at a pressure of 35psia or greater and the stripping carbon dioxide from stream in a stripper operating at a pressure of 35 psia or greater and recovering from stripper a gaseous carbon dioxide product stream having a pressure of 35 psia or greater (Abstract). In some preferred embodiments, the pressure in the stripper, and pressure of the gaseous carbon dioxide product stream are up to 70psia (Col. 2, ln. 31-34). It is also illustrated in the Figure below: gaseous feed stream containing carbon dioxide; absorber 4; stripper 12; lean stream 6 - specific examples of useful alkanolamines include monoethanolamine (primary), diethanolamine (secondary) and methyldiethanolamine (tertiary). Examples of useful organic amines include piperazine and pyrrolidine (Col. 3, ln. 22- 26). Higher pressures in the reboiler would correspondingly increase the reboiler temperature. However, care should be taken to ensure that temperature does not exceed much beyond 140° C (col. 3, in 66 - col. 4, in 2). This CO₂ vapor would need to be compressed prior to further use or disposal. Finally for sequestration applications CO₂ would typically need to be compressed to pressures of the order of 1500 psia or higher (Col. 5, ln. 49-51). Chakravarti et al (US 6497852B2) do not teach temperature from 294°F and below 400°F as claimed. However, reboiler temperature could reach 146° C as evidenced by Rønning et al (US 5832712A) that the absorption liquid which contains CO₂ is passed to a stripping column where the CO₂ is removed from the absorption liquid heated to a temperature of 120°- 150°C (Abstract, in 15-17). Carbon dioxide is released from MEA (monoethanolamine) in the temperature range of 120°- 150°C (col. 4, in 51-52).

(3). **Claims 7 and 11** are rejected under 35 U.S.C. 103(a) as being unpatentable over Chakravarti et al (US 6497852B2) in view of Iijima et al (JP 10-067994), Rønning et al (US 5832712A)

Chakravarti et al (US 6497852B2) do not teach temperature from 294°F and below 400°F as claimed. However, reboiler temperature could reach 146° C as evidenced by Rønning et al

(US 5832712A) that the absorption liquid which contains CO₂ is passed to a stripping column where the CO₂ is removed from the absorption liquid heated to a temperature of 120°- 150°C (Abstract, in 15-17). Carbon dioxide is released from MEA (monoethanolamine) in the temperature range of 120°- 150°C (col. 4, in 51-52). carbon dioxide lean solvent can also add solvents, such as N-methyl pyrrolidone and sulfolane, as occasion demands ([013], ln. 13-14). The advantage of adding co-solvent is demanded occasionally ([013], ln. 13-14). Therefore, it would have been obvious at time of the invention to add the co-solvent of Iijima et al for the CO₂ absorbent of Chakravarti et al in order to achieve the advantages described previously

Response to Arguments

Applicant's arguments filed 9/15/2011 have been fully considered but they are not persuasive.

Regarding the arguments that negative teachings in Chakravarti et al (US 6497852B2) make it improper to combine with Rønning et al (US 5832712A) in the proper manner. Rønning et al (US 5832712A) further expressly limits its temperature conditions to an experiment of short duration in view of expected amine degradation, further demonstrating that nothing in Rønning et al (US 5832712A) supports the proposed combination in the context of Chakravarti et al (US 6497852B2) system intended for long-term operation (§5, page 5, Remarks)..

In reviewing the teaching of Chakravarti et al (US 6497852B2), it recites: However, care should be taken to ensure that the temperature does not exceed **much beyond** 140° C (col. 3, ln.67 – col.4, ln.2). Phrase of limitation “much beyond” does not mean greater than 140° C exactly because “much beyond” means that it is reasonable to include a range possibly 6 degrees margin around 140° C, which is evidenced by Rønning et al (US 5832712A) that temperature of re-boiler may go above 140° C (120° C ~ 150° C). Although in the example of Rønning et al (US 5832712A), it recites: These contaminants are removed in the MEA purification unit which is in operation for only a short time (col. 4, ln.66-67). Disclosed examples and preferred embodiments do not teach away from a broader disclosure or non-preferred embodiments., *In re Susi*, 440 F.2d

442, 169 USPQ 423 (CCPA 1971) because Rønning et al (US 5832712A) do not limit their invention to be experimental in the disclosure.

Applicants further address the Table 1 in Specification for the results of three examples, however, the temperature of Example 1 is 259° F (126° C), but temperature example 2 is 323° F (162° C). Applicants are suggested to provide the unexpected results by using the operating conditions of prior art Chakravarti et al (US 6497852B2) in order to overcome the rejection of obviousness.

Conclusion

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to IVES WU whose telephone number is (571)272-4245. The examiner can normally be reached on 8:00 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Duane Smith can be reached on 571-272-1166. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

Examiner: Ives Wu

Art Unit: 1776

Date: November 7, 2011

/Duane Smith/
Supervisory Patent Examiner, Art Unit 1776